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EXAMINER

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ART UNIT

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Please find below and/or attached an Office communication concerning this application or proceeding.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 11/22/05 have been fully considered but they are not persuasive as explained below:

Rejection of Claim 1 under 35 U.S.C. 103(a) as being unpatentable over Inouchi (US Patent No. 6,184,624) in view of Jansen (US Pub. No. 2005/0063659).

Applicant argues that Jansen does not teach or suggest using a titanium nitride coating on a waveguide to reduce signal propagation delays and that claims 5, 6 only provide reference to titanium nitride. Applicant further contends that presence of both titanium nitride and aluminum oxide on Jansen's lengthy lists of possible materials that may be used as different thin films for an evanescent region in a waveguide does not provide a teaching or suggestion of using a titanium nitride coating on a waveguide main body of aluminum oxide.

Examiner responds that Jansen's reference is used since it teaches providing coatings on waveguides for various applications including microwave applications (Paragraphs 0106, 0120). Further, Jansen also teaches (Paragraph 0075) that numerous coating materials are available that can be used as a part of his invention and while some examples of such materials are given in Paragraph 0075 (Jansen), a detailed list is given under claims 5, 6 that includes titanium nitride. Jansen also teaches that signal in evanescent region (that includes thin film coatings on waveguides) experiences reduced signal propagation delays (Paragraph 0084).

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by

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combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, while Inouchi teaches waveguides made from aluminum oxide (alumina), Jansen teaches the concept that waveguides can be given thin film coatings to improve signal propagation delays. In view of above and further as given below, rejection of claim 1 is maintained.

Rejection of Claim 2 under 35 U.S.C. 103(a) as being unpatentable over Inouchi (US Patent No. 6,184,624) in view of Jansen (US Pub. No.2005/0063659) and Sepp et al (US Patent No. 4,446,558).

Applicant argues that Sepp et al do not teach or suggest that boron nitride material of the waveguide provides highly efficient heat dissipation as mentioned in the office action. Applicant further contend that Sepp et al do not suggest or motivate using a coating on the waveguide body as Sepp et al indicates that it is desirable for the waveguide body to be in intimate contact with the inner surface of housing 10. Applicant then contends that Inouchi, Jansen, and Sepp et al individually or in combination do not teach or suggest a titanium nitride covering on a body made of boron nitride.

Examiner responds that though Sepp et al do not explicitly indicate efficient heat dissipation due to use of boron nitride as body material of waveguide, efficient heat dissipation is an object of the invention (Column 1, lines 49-51) and further Sepp et al teach that efficient heat transfer is accomplished through boron nitride body portions 11, 11b (Column 4, lines 25-30) [the material properties/characteristics of the body would

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be relevant for efficient heat transfer]. Examiner also responds that reference by Sepp et al is used since it teaches use of boron nitride as body material for waveguides. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Sepp et al teach waveguide body made of boron nitride which in combination with teachings of Inouchi and Jansen read on limitations of claim 2. In view of above and further as given below, rejection of claim 2 is maintained.

Further, applicant has added new claims 4-10 for which references have been found that read on their limitations and accordingly claims 4-10 have also been rejected as explained below.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention as explained below:

Claim 9 recites "---- wherein the waveguide main body is made of a boron nitride by a CVD method". Specification teaches that titanium nitride film (not the body that is made

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of boron nitride) is formed by CVD method (Paragraphs 0021, 0029). For the purpose of examination on merits this claim limitation has been interpreted by the examiner as "-- wherein the waveguide main body is made of a boron nitride". If applicants intend to claim that main body is formed by CVD method then applicant should show support for this claim in the specification. Otherwise examiner would consider it as new matter in next office action.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 4, 5, 7, 8, 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inouchi (US Patent No. 6,184,624) in view of Jansen (US Pub. No. 2005/0063659).

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Regarding Claims 1, 5: Inouchi teaches an ion source apparatus (Figure 1) that uses a waveguide body 2 made of Alumina (Column 5, lines 35-45).

Inouchi does not teach about Titanium Nitride coating on waveguide.

Jansen teaches an apparatus (Figures 1, 2A, 2B, 6) that uses titanium nitride coating 16 on waveguide 10 to reduce signal propagation delays (Claims 5, 6 and Paragraphs 0006, 0089, 0093). Jansen also teach that such thin films could be formed on waveguide of any structure implying that such films could be formed as inner or outer layers (Paragraph 0042).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use titanium Nitride film on waveguide as taught by Jansen in the apparatus of Inouchi to reduce signal propagation delays.

Regarding Claims 4,7: Jansen teaches that thin films are manufactured using vapor deposition process (bonding of film with substrate) in vacuum (Paragraph 0075, 0076), but do not teach film formed by CVD method. However films formed by CVD are identical or similar to those formed by vapor deposition method.

Further, regarding process steps for a product (titanium nitride coating in this case) that is taught by prior art (Jensen in this case) it has been held that (Case Law):

PRODUCT-BY-PROCESS CLAIMS ARE NOT LIMITED TO THE
MANIPULATIONS OF THE RECITED STEPS, ONLY THE STRUCTURE
IMPLIED BY THE STEPS

“Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-

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process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. "In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) ".

Regarding Claims 8,10: Jansen teaches all limitations of the claim including that thin film 16 can include different thickness and number of layers (even up to 100 layers) to tailor the thin film region configuration implying that thickness of thin film could be optimized based upon process parameters (Paragraphs 0075, 0080). Jensen also teaches (Paragraph 0079) that as an example coating thickness of one layer could be 0.27 micron, which for 100 layers could have a total thickness of 27 micron (within the claim limitation range of 10-500 microns).

Regarding optimization it has been ruled by courts (Case law):

"Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. It would have been obvious to one having ordinary skill in the art to have determined the optimum values of the relevant process parameters through routine experimentation in the absence of a showing of criticality. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)."

Claims 2, 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Inouchi (US Patent No. 6,184,624) in view of Jansen (US Pub. No.2005/0063659) as applied to Claim 1 and further in view of Sepp et al (US Patent No. 4,446,558).

Regarding Claims 2, 9: Inouchi in view of Jensen teach all limitations of the claim except for waveguide body made of Boron Nitride.

Sepp et al teach an apparatus (Figure 2) that uses waveguide body made of Boron Nitride to assure highly heat efficient dissipation (Abstract, Column 1, lines 48-52 and Column 2, lines 50-55).

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Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use waveguide body made of Boron Nitride as taught by Sepp et al in the apparatus of Inouchi in view of Jensen to assure highly efficient heat dissipation.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inouchi (US Patent No. 6,184,624) in view of Jansen (US Pub. No. 2005/0063659) as applied to Claim 1 and further in view of Taki et al (US Patent No. 5,359,177).

Regarding Claim 6: Inouchi in view of Jensen teach all limitations of the claim except for waveguide body of wedge shape.

Taki et al teach a microwave plasma apparatus (Figure 7) that uses waveguide body 131 of wedge shape, discharge space 121 and dielectric plate 116 for treating a substrate 120 (Column 5, line 2-55).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use waveguide body of wedge shape as taught by Taki et al in the apparatus of Inouchi in view of Jansen to intensify the microwave electric field coupled to the dielectric field (Column 5, lines 50-55).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

1) Capewell et al (US PG PUB. No. 2004/0042736) teach an apparatus (Figure 3) a waveguide structure 310 made of glass or transparent plastic and waveguide is coated on the outside with broadband highly reflective coating 300 (Paragraphs 0022, 0023).

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2) Baur (US Patent No. 5,568,304) teaches an apparatus (Figure 1) that includes an antenna 12 comprising of a cylindrical rod 16 formed of low pass filter material and is provided with a coating 20 on the outside (Column 2, lines 20-45). Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rakesh K. Dhingra whose telephone number is (571)-272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Rakesh K Dhingra



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